

*Sub A5*  
What is claimed is:

1. A reactor/storage tank for use in a closed Brayton cycle system comprising:

*NA 15A*  
a housing;

a liquid metal fuel<sup>12</sup> contained within said housing;<sup>10</sup>

*Not known*  
(an oxidant source having an oxidant contained therein, said oxidant causing a heat generating reaction with said liquid metal fuel;

*20*  
an oxidant injector penetrating said housing below the surface of said liquid metal fuel and in communication with said oxidant source for providing a controlled<sup>10</sup> flow of said oxidant to said liquid metal fuel;

a working gas;<sup>18</sup>

*14*  
a working gas inlet penetrating said housing below the<sup>12</sup> surface of said liquid metal fuel for dispersing said working gas into said liquid metal fuel wherein heat is transferred to said working gas by direct contact with said liquid metal fuel, said working gas passing through said liquid metal fuel and becoming<sup>18</sup>

contaminated with metal vapors from said liquid metal fuel;

an afterburner oxidant injection means, penetrating said housing above said liquid metal fuel and in communication with said oxidant source, for providing a controlled flow of said oxidant within said housing above said liquid metal fuel so as to react with said metal vapors to form a solid product therefrom leaving said working gas free of said metal vapors; and

a working gas outlet, penetrating said housing above said liquid metal fuel, for communicating said heated, metal vapor free, working gas to said Brayton cycle system.

2. A reactor/storage tank for use in a closed Brayton cycle system according to claim 1 wherein said afterburner oxidant injection means further comprises:

an oxidant sensor, disposed within said working gas outlet, for measuring the amount of oxidant present in said outlet;

D.I. ( an oxidant afterburner injector, disposed within said housing above said liquid metal fuel, for supplying an

oxidant within said housing above said liquid metal fuel;

an oxidant control valve<sup>26</sup> in communication with said oxidant afterburner injector and with said oxidant source, said control valve being electrically controllable to reduce or increase the flow of said oxidant to said oxidant afterburner injector; and

a valve controller<sup>28</sup> electrically connected to receive information from said oxidant sensor, said valve controller being electrically connected to said oxidant control valve for controlling the flow of oxidant to said oxidant afterburner injector.

3. A reactor/storage tank for use in a closed Brayton cycle system according to claim 2 wherein said afterburner oxidant injection means further comprises a temperature sensor disposed within said working gas outlet and for measuring the temperature of the ejected working gas.

4. A reactor/storage tank for use in a closed Brayton cycle system according to claim 3 wherein said liquid metal fuel comprises an aluminum magnesium alloy.

5. A reactor/storage tank for use in a closed Brayton cycle system according to claim 4 wherein said oxidant comprises oxygen.
6. A reactor/storage tank for use in a closed Brayton cycle system according to claim 5 wherein said working gas comprises an inert gas.
7. A reactor/storage tank for use in a closed Brayton cycle system according to claim 5 wherein said working gas comprises argon.
8. A reactor/storage tank for use in a closed Brayton cycle system according to claim 5 wherein said working gas comprises a mixture of helium and xenon.
9. A reactor/storage tank for use in a closed Brayton cycle system according to claim 3 wherein said liquid metal fuel comprises an alkali metal.
10. A reactor/storage tank for use in a closed Brayton cycle system according to claim 9 wherein said oxidant comprises a chlorofluorocarbon.

11. A reactor/storage tank for use in a closed Brayton cycle system according to claim 10 wherein said working gas comprises an inert gas.

12. A reactor/storage tank for use in a closed Brayton cycle system according to claim 10 wherein said working gas comprises argon.

13. A reactor/storage tank for use in a closed Brayton cycle system according to claim 10 wherein said working gas comprises a mixture of helium and xenon.